

CLAIMS

What is claimed is:

1 1. A system, comprising:
2 a rotating shaft having shaft movement parameters;
3 an incremental shaft encoder to convert the shaft
4 movement parameters of the rotating shaft into differentially
5 encoded electrical signals suitable for processing;
6 a first optical converter to convert the differentially
7 encoded electrical signals into optical signals;
8 a plurality of optical conductors to carry the optical
9 signals; and
10 a second optical converter to receive and convert the
11 optical signals back into electrical signals.

1 2. The system of claim 1, wherein said plurality of
2 optical conductors includes fiber optic cables.

1 3. The system of claim 1, further comprising:
2 an optical coupler configured to couple the shaft
3 movement parameters to the incremental shaft encoder.

1 4. The system of claim 1, wherein the first optical
2 converter includes transient over-voltage protection of the
3 differentially encoded electrical signals.

1 5. The system of claim 4, wherein the first optical
2 converter includes level shifting of the input voltage of the
3 differentially encoded electrical signals.

1 6. The system of claim 1, wherein the first optical
2 converter includes a differential-to-single converter
3 configured to convert the differentially encoded electrical
4 signals to single-ended electrical signals.

1 7. The system of claim 6, wherein the first optical
2 converter includes a plurality of optical couplers to couple
3 the single-ended electrical signals to the optical conductors
4 for transmission.

1 8. The system of claim 1, wherein the second optical
2 converter includes a plurality of optical couplers to receive
3 the optical signals from the optical conductors, and to
4 convert the optical signals to single-ended electrical
5 signals.

1 9. The system of claim 1, wherein the second optical
2 converter includes a single-to-differential converter
3 configured to convert the single-ended electrical signals to
4 differentially encoded electrical signals.

1 10. A method, comprising:
2 receiving differentially encoded shaft encoder signals;
3 converting the differentially encoded shaft encoder
4 signals into single-ended electrical signals;
5 converting the single-ended electrical signals into
6 optical signals; and
7 transmitting the optical signals through optical
8 conductors.

1 11. The method of claim 10, further comprising:
2 coupling shaft movement parameters of a rotating shaft.

1 12. The method of claim 11, further comprising:
2 converting the coupled parameters into electrical
3 signals.

1 13. The method of claim 12, further comprising:
2 differentially encoding the electrical signals.

1 14. The method of claim 10, further comprising:
2 receiving the optical signals from the optical
3 conductors.

1 15. The method of claim 14, further comprising:
2 converting the optical signals into single-ended
3 electrical signals.

1 16. The method of claim 15, further comprising:
2 differentially encoding the single-ended electrical
3 signals.